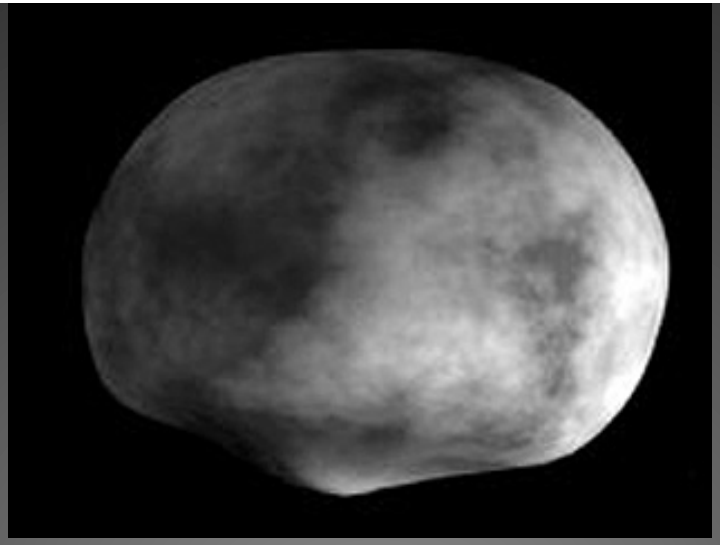
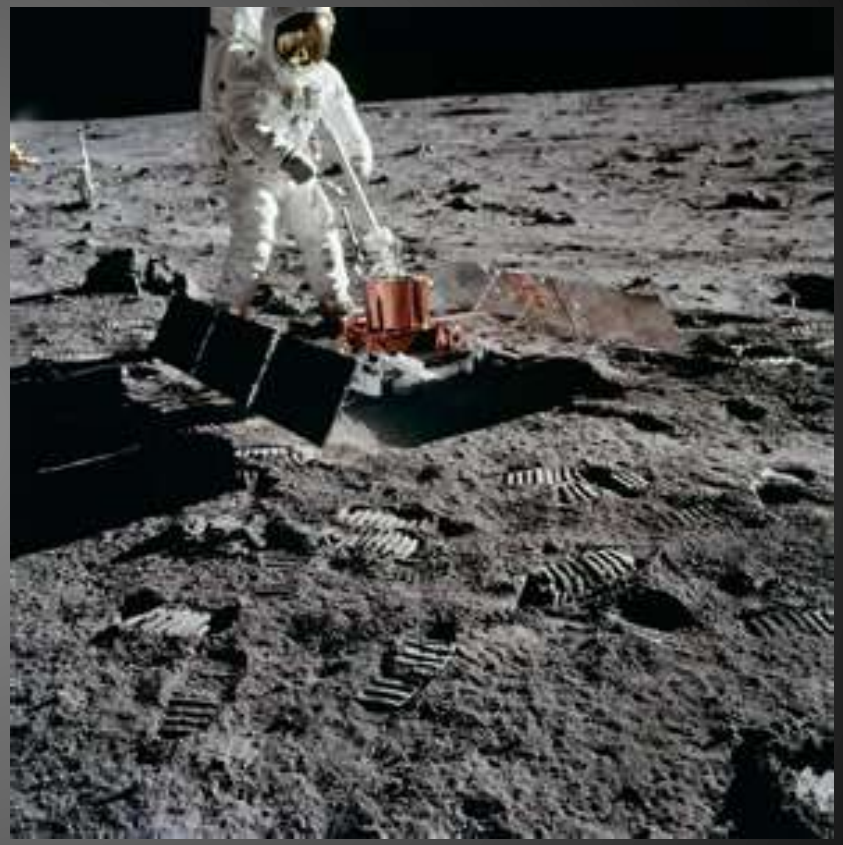


# Vesta 1: The First Mission to 4 Vesta

Collin, Christian, Parker
Camden Middle School
South Carolina
Mrs. Willis

# The Exploration Purpose

- The purpose for exploring 4 Vesta, the asteroid similar to Earth's composition, is to gather geologic data in order to gain a better knowledge of how the solar system formed.



# Food for Astronauts

- Food is an important topic because everyone, including astronauts, needs food to live and complete everyday tasks. For astronauts, eating healthy is extremely important in space. Due to the low gravity that will cause the astronauts to have weaker bones on 4 Vesta, it is important for the astronauts to have calcium and vitamin rich foods that include meats, fruits, and vegetables, in order to keep the bones healthy.

# Problems and Solutions for Food

## Problems

- When the crew lands on 4 Vesta, how will the crew members eat while moving around?
- How will the dome be safe?
- If the exploration of the asteroid is longer than expected, what will the crew do if they start to run low on food supplies?
- Since food can float in low gravity, how will the crew secure the food, drink their beverages, and eat the food?

## Solutions

- A clear, plastic, inflatable, dome that is 18.3 meters long, 9.1 meters wide, and 4.6 meters high can be attached to one side of the upright capsule so the crew could step inside from one door of the capsule into a larger area where food items could be stored alongside other equipment that would be used for the exploration of 4 Vesta. The dome cannot be used when the capsule is traveling through space, so crew members will have to stay in their seats and eat all the way to the asteroid and back to Earth.
- In order for the dome to be safe, extra layers would be provided so that if one layer is punctured, another layer could take the old one's place so oxygen stays intact.
- If the exploration of the asteroid is longer than intended and food supplies get low, a small garden can be anchored to the floor of the dome and could be used to grow vegetables needed for nutrition.
- Silverware and straws will be provided, and Velcro placemats would be used to hold the silverware and food trays in place as the crew eats. The straws are for the drinks so the crew can easily drink without the liquids floating aimlessly around due to the low gravity of the asteroid.

# More on Space Food

- Some of the foods that are packed for space can be dehydrated or freeze-dried, and the addition of water can make the food what it was before going into space. Meat and poultry are cooked to kill bacteria and placed in foil pouches before the space flight. Other foods can enter space the way there are on Earth, like candy bars.
- Scissors are added to an astronaut's silverware so they do not have trouble opening their food.
- Food is used for health and work, but it gives astronauts a feeling of home.
- Sometimes, astronauts have to learn how to work together to prepare certain foods like a peanut butter sandwich.

# Exercising in a Low Gravity Environment

- Even though exercise is an important activity on Earth, astronauts have to exercise at least one hour a day so their muscles do not begin to weaken in the low gravity. The heart, one of the most important organs, can start to deteriorate in space just like someone who is forced to stay in bed for a major length of time.

# Solving the Exercise Problems

## Problems

- Where and how will the exercise equipment be stored while traveling to 4 Vesta?
- What form of exercise will be preformed while the crew heads towards the asteroid?
- Where will the work out routines occur when the crew reaches the destination?
- What will power equipment such as treadmills inside the dome?
- How will astronauts stay on the machines to work out?
- Will the crew have to establish a schedule for the time to exercise?

## Solutions

- Exercise gear will be stored in the cargo hold of the capsule until arrival to the asteroid. The gear will be either small or foldable to allow packing.
- Exercise cords, used for cardio (heart) health exercise, will be used as the crew travels through space to reach the asteroid. Also, the seats can be attached with pedals, gears, and electronic touch screens just like a stationary bike so the crew can work on their leg muscles as well.
- Since an inflatable dome will be used for the crew to eat in, room in the dome can be provided for the routines to take place.
- Treadmills and other stationary equipment will be powered by solar energy.
- The crew can harness themselves with harnesses and cords to the machines in order to work out in low gravity.
- Since the hours of sunlight on 4 Vesta last only about six hours, a time will have to be scheduled within the six hours so the machines can collect and store solar energy without any problems.

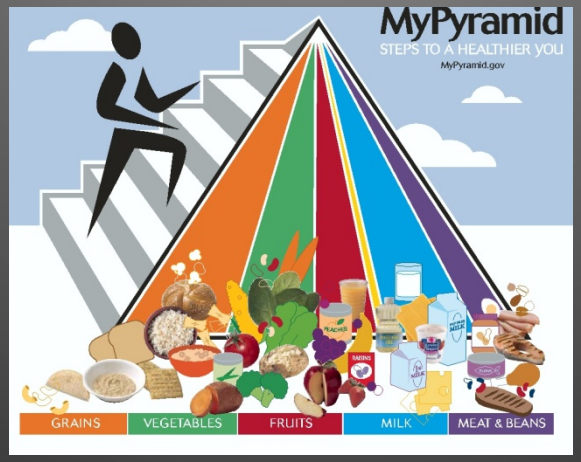
# Information on Space Exercising

- Astronauts cannot walk or lift heavy objects in space because the weightlessness of space makes anything heavy weigh almost nothing.
- Sweat, just like any other liquids in space, can gather in blobs due to microgravity and the astronauts have to soak them up with a towel before the blobs disrupt any equipment.
- Astrobatics, a relaxing way to do complicated moves in microgravity, is not available on Earth. This helps exercise the body and the mind.
- Exercise helps astronauts complete the tasks they are assigned, and it keeps them in shape as well as keeping their muscles from weakening.

# Conclusions

- Food and exercise overlap and support each other because astronauts need food like we do to have the energy to exercise. Water is important for hydration.
- When it comes to exercise and food, astronauts cannot choose more unhealthy food than healthy food when they plan out their meals and snacks for their journey to space and the asteroid.
- By using an inflatable dome for the astronauts to eat in, an area will be created for daily exercise routines and equipment placement. The only cost for placing workout gear in the dome would be less area to fit a garden to grow food.

+




= **A Healthy Astronaut**

# Bibliography


- "Space Topics: Asteroids and Comets." *Asteroid 4 Vesta*. Web. 17 Mar. 2012. http://planetary.org/explore/topics/asteroids_and_comets/vesta.html.
- Taylor, Robert. *Life aboard the Space Shuttle*. San Diego, CA: Lucent, 2002. Print.
- "What Do Astronauts Eat in Space? Can They Grow Food?" *Curious About Astronomy:*. Web. 17 Mar. 2012. http://curious.astro.cornell.edu/question.php?number=132.
- "What Exercise Machines Do Astronauts Use?" *LIVESTRONG.COM*. Web. 17 Mar. 2012. http://www.livestrong.com/article/405158-what-exercise-machines-do-astronauts-use/.